

1. General Comment

In many instances, the BERA results would be easier to interpret if the text compared sample results to ecological benchmarks, discussing exceedances of these benchmarks, rather than results that were below the reporting limit (e.g., PCBs) or listing COPECs that were not detected.

2. Page ES-6, Executive Summary, last paragraph, last sentence

It is noted that when all of the uncertainty is combined, it is likely that any potential risks are overestimated. However, it is just as likely that risks are underestimated. Uncertainties are numerous and significant, but the impact of identified uncertainties is unknown. Therefore, this statement should be revised or removed from the text.

3. Page 1-2, Section 1.1, second sentence

The text suggests that the waste material is surficial as it states that its 0 to 18 feet deep and overlies site soils. Wastes in the areas described are not surficial, but are buried, and should not be confused with the surface debris areas of the site. This sentence should be revised to reflect this.

4. Page 2-4, Section 2, fifth paragraph, first sentence

It is indicated that most of the site is undisturbed. This statement may not be correct as almost the entire site is disturbed. This sentence should be revised.

5. Page 3-8, Section 3.2, last paragraph, last sentence

Although it is acknowledged that common landfill practices may have affected the distribution of contaminants at the site, such customs are still related to landfill operations and associated contamination regardless if the source is waste material or not.

6. Page 3-9, Section 3.3, first and second bullets

It is noted that Loantaka and Black Brooks are not hydrologically connected to the landfill. It is also indicated that groundwater flows radially from the landfill. Therefore, some uncertainty may be likely with the possibility of a hydrological connection to these water bodies.

7. Page 3-10, Section 3.4

It is indicated in the document that the American robin is the representative vermivorous bird. However, in Section 3.4 the robin is also referred to as an invertivore. This is also the case for the short-tailed shrew. For clarity purposes, the language regarding these receptors should be consistent.

8. Page 3-11, Section 3.4 Second paragraph, first sentence

Landfill waste and runoff from landfill surfaces are potential sources of COPECs in both landfill wetland habitat and perimeter wetland habitat soils and sediments. Groundwater should also be included as a potential source as it's been documented that groundwater flows radially from the landfill into the adjoining wetlands.

9. Page 3-15, Section 3.7.2, Investigation Area table

It is indicated that the landfill covers roughly 170 acres. However, the Investigation Area table in this section appears to list the total acreage as 435. Further explanation should be provided for this discrepancy.

10. Page 3-16, Section 3.7.3.1, last paragraph

It is stated that the risk equation uses ingestion rates based on dry weights. This sentence should be revised to include "the food web model equation" instead of "the risk equation."

11. Page 4-14, Section 4.3.2.1, last bullet, Grain Size

There may be a formatting error after the second sentence. It appears a new paragraph is needed afterwards.

12. Page 4-18, Section 4.3.3

It is indicated that surface soil samples were composited a minimum of 5:1 at each sampling node. Further information should be provided to clarify whether any potential hot spots may have been missed due to compositing.

13. Page 4-23, Section 4.3.4

Where possible, the tadpole and fish species comprising these samples should be identified. This information may help refine exposure pathways (e.g., herbivorous vs. carnivorous or omnivorous taxa) and also add information on species diversity (i.e., one dominant amphibian species, or multiple taxa).

14. Page 4-27, Section 4.3

The results of the biota samples were provided in Section 4.3 Field Investigation Results. The description of the biota samples should include the type of sample (i.e., whole body or liver or muscle).

15. Page 4-28, Section 4.3.5.1, third and fourth bullets

The text in these bullets refer to Figure 4-6 regarding terrestrial small mammal samples. However, Figure 4-6 illustrates aquatic sampling locations. This section should refer to Figure 4-8.

16. Page 4-43, Section 4.3.8, third bullet

Exposures for even short time periods at dissolved oxygen (DO) concentrations near the reported minimums can have severe effects on exposed biota (including mortality for sensitive taxa). The potential for low DO to contribute to adverse effects (e.g., reduced growth or survival) needs to be considered and discussed, preferably in the Uncertainty section of the BERA.

17. Page 4-50, Section 4.3.10

Several statements are made suggesting that any “major anthropogenic disturbances” be avoided due to habitat quality or the presence of a single transient State-listed salamander species within areas of known surficial debris and possible site-related contamination. Although not stated, use of such language suggests that in areas such as these, major disturbances such as remedial actions should be avoided. Any potential remedial actions which might occur may further enhance habitat quality, especially if restoration of these areas is considered.

18. Page 4-50, Section 4.3.10

Figure 4-14 is referenced several times on this page; however, there was no such figure provided in the report and appears it was inadvertently excluded.

19. Page 5-2, Section 5

The magnitude of the exceedance, that is how much the hazard quotients (HQs) exceed "1.0," was used in evaluating the potential of ecological risks to site-specific receptors. Specifically, a HQ between 1 and 10 was referred to as moderate potential risk and a HQ greater than 10 is considered high potential risk. However, the magnitude of HQs does not necessarily indicate the potential for effects. USEPA has not identified a method of evaluating the magnitude of HQs relevant to the degree of risk, and only recognizes whether an HQ is greater or less than "1". The effects seen at different concentrations of a contaminant are frequently not linear, and the degree of exceedance of a screening benchmark does not necessarily indicate more severe impacts. Any statement to link the magnitude of the HQs to the degree of risks to the receptors should be removed from the report.

20. Page 5-2, Section 5, first bullet

It is stated that if the No Observable Adverse Effect Level (NOAEL) HQ is greater than 1 but the Lowest Observable Adverse Effect Level (LOAEL) HQ is less than or equal to 1, then potential risk to a receptor population is considered low. This statement should be revised because there is no clear link between magnitude of HQ and risk to individuals or populations. Also, risks that fall between the NOAEL and LOAEL may or may not be linked to adverse effects at the population or individual level, depending on chemical of interest and toxicity reference value (TRV) selected.

21. Page 5-3, Section 5.1.1

The discussion of Measurement Endpoint 1-1 includes observational notes such as wildlife activity (e.g., burrows, prints, calls). This information may not necessarily provide any conclusive data for the weight of evidence evaluation. The assessment of wildlife activity may require a long term study.

22. Page 5-4, Section 5.1.1, paragraph between bullets, third to last sentence

It is noted that since there were HQs in excess of one for most of the surface soil samples collected, the site should be barren of vegetation. This statement is not accurate. HQs greater than one only suggest a potential for some type of adverse effect, not 100% mortality of test species or species represented by test species. This statement should be revised.

23. Page 5-4, Section 5.1.1, third bullet on page

It is stated that given the absence of any stressed or atypical vegetation during the 2016 habitat assessment it is not anticipated that there are any effects on plants based on the observed wetland or terrestrial soil metal concentrations. This statement should be revised to indicate that there were no "observable" stressed or atypical vegetation as not all forms of stress are readily observable during a one-time survey.

24. Page 5-6, Section 5.1.2, second bullet

It is noted that the sediment inorganic COPECs were evaluated using the geometric mean of the Low Effect Level (LEL) and Severe Effect Level (SEL) values. Further information should be provided regarding why the geometric mean was used instead of comparisons of measured data to both the LEL and SEL.

25. Page 5-6, Section 5.1.1, second paragraph

The evaluation of surface water results included a statement that the HQs for barium were above one but less than 10. The only important threshold is HQ of 1. It may be more informative to discuss the limited toxicity data associated with barium in surface water (resulting in low confidence with thresholds, benchmarks, or criteria).

26. Page 5-12, Measurement Endpoint No. 3-1, second paragraph.

Benthic invertebrates vary greatly in sensitivity to chemical exposures. Some are highly tolerant, others highly sensitive. There may not be sufficient information to make any statements regarding the applicability of benthic macroinvertebrate (BMI) toxicity data to larval amphibians. Risks to larval amphibians may be better evaluated using chronic NRWQC, dissolved, for most chemicals, since these criteria are intended to protect 95% of the nation's aquatic life, including larval amphibians. Sediment-associated risks to amphibians and/or reptiles are generally unknown (data presented for PCBs are an exception).

27. Page 5-15, Section 5.1.4 Assessment Endpoint No. 4 (Herbivorous Birds)

This section indicates that the summary tables for the resulting hazard quotients for the short-tailed shrew are provided in Table 5-8a and Table 5-8b. However, this notation should refer to the mallard rather than the short-tailed shrew. The rest of the document should be checked for similar issues.

28. Page 5-15, Measurement Endpoint No. 4-1, last sentence (and elsewhere in the BERA)

The discussion of measurement endpoint 4-1 indicates that there are no risks from the use of the site by the Mallard duck. The phrase "No risks" should be revised to "no unacceptable risks" or "risks are within acceptable range" or similar.

29. Page 5-15, Section 5.1.4, third paragraph

The word "mammal" should be deleted and revised to read "herbivorous bird".

30. Page 5-19, Section 5.1.6, second paragraph

The verbiage "soil invertebrates" should be deleted and revised to read "vegetation" as the assessment endpoint being evaluated is for herbivorous mammals.

31. Page 5-39, Section 5.2.2.4, third paragraph

Although morphologically similar, shrews are not at all related to mice or other rodents. Shrews are carnivores/invertivores, while most mice are omnivores. Therefore, some uncertainty may be associated with using rodent data for shrews. TRVs for other mammalian carnivores (e.g., mink) may be more appropriate for evaluating risks to shrews.

32. Page 5-41, Section 5.2.2.4, first paragraph, reference to MacDonald et al. (1996)

In the TRV development it is noted that the threshold effect levels (TELs) and the probable effects levels (PELs) from MacDonald et al. 1996 were used. It is unclear why the consensus-based values derived by the newer MacDonald et al. 2000 (MacDonald, DD, CG Ingersoll, and TA Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Archives of Environmental Contamination and Toxicology 39:20-31) paper are not used.

33. Page 5-45, Section 5.2.2.5

It is stated that the TRV for inorganic mercury is lower than the TRV for methyl mercury. Further information regarding this statement should be provided. Specifically, the studies that were used to make this conclusion should be identified.

34. Page 5-49, Section 5.4

It is noted that risks to amphibians are unlikely since tadpoles were abundant at the sampling locations. However, presence or abundance of tadpoles does not equate to unlikely risks. This statement should be revised.

35. Page 5-50, Section 5.4

It is stated that generally, there is no conclusive linkage between sediment PCB concentrations and amphibian population effects. The general lack of a conclusive linkage between sediment PCB concentrations found at this site and amphibian population effects needs to be better explained, incorporating site-specific lines-of-evidence into the discussion to support the lack of risk position.

36. Page 5-50, Section 5.4

It is stated that in conjunction with the lack of correlation between sediment toxicity (generally regarded as a more sensitive receptor than amphibians) and PCB levels in sediments, it is concluded that PCBs present in the sediments at the site do not present an unacceptable risk to amphibians and reptiles. This statement should be revised. Sediment toxicity should not be considered a receptor. It is assumed that this text is intended to imply that comparison of BMI toxicity and PCB concentrations in sediment can be extrapolated to amphibians. There may be considerable uncertainty associated with this extrapolation.

37. Page 5-51, Section 5.4, top paragraph

It is unclear why the conclusion of risk overestimation is more likely than underestimation. Both are possible because measured data for invertebrates and estimated data for plants are both associated with uncertainty. Further information should be provided to justify this statement.

38. Page 5-51, Section 5.4, last paragraph

The final paragraph on this page notes that any potential risks are overestimated. It may be just as likely that risks are underestimated. It may be helpful to revise this paragraph to conclude there is a low potential for population level adverse effects, and simply state that conservative assumptions were employed where applicable to minimize the potential for risk underestimation.

39. Page 6-54, Section 6, third paragraph, first sentence

The text should be revised to read “West Pond#1” instead of “Wart Pond #1.”

40. Page 6-54, Section 6

It is noted that despite the calculated risks, there were an abundance of burrows and no evidence of any pathologies in the small mammals that were collected. However, the presence of burrows does not imply no risk. Additionally, histopathological examinations were not done on collected small mammals. This conclusion should be revised.

41. Page 6-55, Section 6, third paragraph, second sentence

It is stated that if any disturbances or restoration efforts are undertaken in West Pond #1, there may be a lag time of the recruitment by some benthic organisms since this pond is not hydrologically connected to other surface waterbodies. However, the concern for this lag time may not be significant since it is assumed that most of the benthos inhabiting the pond consists of insect larvae and perhaps some species of snails and other common benthic species. Any concerns related to disturbing benthic communities in the pond should not prohibit any restoration activities which may in fact enhance or improve benthic habitats once completed. If there is a cause for concern, it may be appropriate to consider a more comprehensive study on benthic communities prior to any disturbance activities.

42. Page 6-55, Section 6, last bullet on page

The text states that HQs in general were lower within Great Swamp National Wildlife Refuge (GSNWR) terrestrial habitats relative to those outside of refuge boundaries and thus those habitats outside of the GSNWR were more relevant for remedial action objective (RAO) development. Although generally speaking, this may be a valid observation, the Refuge is still part of the site, not as the text suggests, and any RAOs developed would be applicable for areas both inside and outside Refuge boundaries. Furthermore, it is unclear what is trying to be conveyed regarding the observations of less surficial debris within GSNWR property than outside its boundaries. The amount of debris should be irrelevant in regards to the development of RAOs. In addition it is expected that there is some contamination associated with the surface debris.

43. Page 6-56, Section 6

It is stated that total PCBs in soils do not need to be included as a BERA-related remedial action objective for the Feasibility Study (FS). This statement may not appropriate for a BERA.

44. Page 6-56, Section 6

Blue gill should be one word.

45. Table 3-2

It appears that the column titles have been switched. Assessment endpoints should be the first column and measurement endpoints should be the second column.

46. Table 4-2a – 4-2c

The data qualifier “V” in tables 4-2a through 4-2c should be defined.

47. Table 4-4

If possible, it may be helpful to add forage fish species and tadpole species collected to this table.

48. Table 4-6

The mammal species collected, and tissue type (e.g., whole body) could be added to this table.

49. Figures 3-1x

It may be useful to add footnotes to clarify that amphibians and reptiles are considered potentially exposed receptors, for both aquatic and terrestrial environments, but are not quantitatively evaluated in most cases. Also, the selected representative species for a particular feeding guild (e.g., omnivorous birds) should be stated. Currently some are shown as a particular species (e.g., little brown bat), while others are general (e.g., hawks). It is assumed that a particular species is selected in each case (i.e., instead of “hawks”, consider “red-tailed hawk”, if accurate).